

## Notice of Allowability

Application No.

10/708,522

Applicant(s)

HUNG, RICHARD

Examiner

Sajous Wesner

Art Unit

2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the response filed on 8/30/07.
2. ☒ The allowed claim(s) is/are 1-6.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
Sajous Wesner  
Primary Examiner  
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## **DETAILED ACTION**

### **Remark**

This communication is responsive to the amendment and response dated 8/30/07. Claims 1-6 are presented for examination.

### ***Allowable Subject Matter***

1. Claims 1-6, after further reconsideration and search, are allowed over the prior art.

### **Reasons for Allowance**

2. The following is an examiner's statement of reasons for allowance:

The present invention is directed to a dynamic dithering algorithm for a four-time resolution refinement of an image, both spatially and temporally.

The best prior art of record, the Applicant's Admitted Prior Art (AAPA) teaches a dithering algorithm, wherein when the 2-bit LSBs being 00, no carry is generated for the 6-bit MSBs among the four pixels of an observed block, to which the pixel under operation belongs. Secondly, with the 2-bit LSBs being 01, one of the four pixels is added a carry for the 6-bit MSBs. Further more, with the LSBs being 10, two of the four pixels are added a carry for the 6-bit MSBs, and thus an average extra pixel value of 2 is obtained. Lastly, with the LSBs being 11, three of the four pixels are added a carry for the 6-bit MSBs, so that an average pixel value of 3 is obtained. See figures 1 and 2. However, the AAPA fails to teach a dither algorithm, for four-time resolution refining for

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an image comprising a plurality of frames scanned with a plurality of pixels, each pixel comprising a plurality of bits, an observed unit being a 4x2 block of the pixels, the observed unit having a first sub unit and a second sub unit, each the sub unit comprising a 2x2 block of the pixels, the 2x2 block having an upper-left pixel, an upper-right pixel, a lower-left pixel, and a lower-right pixel, the 2x2 block having an upper row consisting of the upper-left pixel and the upper-right pixel, and having a lower row consisting of the lower-left pixel and the lower-right pixel, the dither algorithm comprising: for each of the pixels of the second sub unit of the observed unit, when the 2-bit LSBs being 00, no operation is rendered, when the 2-bit LSBs being 01, a fourth operation is rendered in repeated sequential fashion in the four-frame period to the lower-left pixel, the upper-right pixel, the upper-left pixel, and the lower-right pixel, when the 2-bit LSBs being 10, a fifth operation is rendered in repeated sequential fashion in the two-frame period as the second operation is, when the 2-bit LSBs being 11, a sixth operation is rendered in a repeated sequential fashion in the four-frame period as the fourth operation is (as recited in claims 1-6). Another prior art of record, the Martin (US 6714206) reference discloses a method and system for spatial-temporal dithering for displays with overlapping pixels. Martin uses various other dithering techniques, such as "frame rate control", in order to improve the image quality of a liquid crystal display that displays color with a lower depth than can be provided to the display. Frame rate control techniques use both "temporal dithering" and "spatial dithering," which can take advantage of the slow response time of liquid crystals to small changes in applied voltage. Temporal dithering refers to dithering from one frame to the next as

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opposed to dithering within a single frame. With frame rate control, a single pixel may have its intensity value varied from one frame to the next to account for the loss of depth. For example, if the 8-bit intensity value of 33 is mapped to a 6-bit intensity value of 8 with a remainder of 1, then a pixel may have its intensity value set to 9 during every fourth frame and set to 8 during the remaining 3 frames. Thus, temporal dithering tends to approximate the 8-bit intensity value over time, rather than over space. Frame rate control uses a combination of dithering techniques by defining a super-pixel or pattern of pixels to indicate which pixels should have their intensity levels increased from one frame to the next. For example, if a super-pixel comprises 4 pixels, then an 8-bit intensity value of 33 can be approximated by setting the intensity value of the first pixel of the super pixel to 9 and setting the intensity value of all other pixels to 8 during the first frame, by setting the intensity value of the second pixel of the super-pixel to 9 and setting the intensity value of all other pixels to 8 during the second frame, and so on. Thus, the super-pixel approximates the 8-bit intensity value using both temporal and spatial dithering. However, Martin, like the AAPA fails to teach the above underlined features of the invention in the manner recited in the claims. For the aforementioned reasons, the limitations of claims 1-6 of the instant invention are allowed over the prior art.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sajous Wesner whose telephone number is 571-272-7791. The examiner can normally be reached on M-F 9:15-6:45.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 571-272-7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Sajous Wesner  
Primary Examiner  
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WS  
9/20/07